3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL IMPACTS

3.1 Air Quality [See Section 6, Reference 6]

A total of 42 receptors were modeled within the project corridor. **(See Exhibit 10.)** Results show that all existing and predicted carbon monoxide concentrations are below the one-hour standard of 35 ppm and the eight-hour standard of 9 ppm.

Pulaski County is designated as **in attainment** for all transportation-related pollutants (carbon monoxide, hydrocarbons, nitrogen oxides and particulates). According to the calculated existing and future emissions of all transportation-related pollutants, the proposed construction of any one of the proposed build alternates for the Somerset Northern Bypass is not expected to add to the pollution burden of the attainment areas within the South Central Intrastate Air Quality Control Region. In addition, current and future emissions of transportation-related pollutants associated with the project are not expected to alter Pulaski County attainment status.

This project is in an air quality area where the State Implementation Plan does not contain transportation measures. Therefore, the Amended Final Guidance Conformity Procedures implemented September 15, 1997 do not apply. With respect to the latest conforming state transportation improvement program, the proposed project is located on pages 320 and 321 of the Kentucky Statewide Transportation Improvement Program (STIP) for Fiscal Years 2001-2006, approved October 2000. Based on this analysis, the project is in compliance with the Kentucky State Implementation Plan for Attainment and Maintenance of National and State Ambient Air Quality Standards.

No cumulative or indirect air quality impacts are expected with any build alternate.

3.2 Highway Noise [See Section 6, Reference 7]

3.2.1 Receptor Sites

A total of 16 receptor sites were modeled within the project corridor, representing a total of approximately 486 residential, 22 commercial and 3 church receptors. **(See Exhibit 11 and Table 5.)** The land-use categories for each receptor site are included in **Table 5**.

3.2.2 Noise Abatement Criteria

Land-use categories B and C apply to this project. Category B includes the exterior of a residence, school, church or other sensitive receptor. The FHWA Design Noise Abatement Criteria (NAC) for Category B is 67 dBA Leq. Category C includes developed lands or properties, such as commercial buildings, etc. The FHWA NAC for Category C is 72 dBA Leq. Traffic noise impacts occur when the predicted traffic noise levels approach (within one dBA) or exceed the NAC set for either category OR produce a change in noise levels of 10 dBA or

greater over existing levels. Impacts on receptors that meet or exceed any of these standards may be considered for noise abatement.

3.2.3 Noise Levels

The existing noise levels at the sixteen receptor sites range from 41 to 79 dBA Leq, while the predicted No-Build noise levels range from 45 to 81 dBA Leq. **(See Table 6.)** The predicted No-Build levels range from 0 to +5 dBA above the existing levels. **(See Table 7.)** The predicted Build Alternate noise levels range from 52 to 89 dBA Leq for the North Alternate, 51 to 82 dBA Leq for the Crossover Alternate and 51 to 82 dBA Leq for the South Alternate. (**See Table 6.)** Predicted levels for the Build Alternates result in a 0 to +35 dBA change over existing levels and a 0 to +30 dBA change from predicted No-Build levels. **(See Tables 7 and 8.)**

The Residential NAC of 67 dBA Leq is approached (within 1 dBA), equaled or exceeded at Sites 2, 3, 6, 7, 9, 12 and 16 for the **North Alternate**, approached or exceeded at Sites 2, 3, 8, 10, 12 and 16 for the **Crossover Alternate**, and equaled or exceeded at Sites 1, 2, 3, 6, 10, 12 and 15 for the **South Alternate**. The Commercial NAC of 72 dBA Leq is exceeded at Site 14 for the **North, Crossover** and **South Alternates**. A change in noise levels of 10 dBA or greater over the existing level occurs at Sites 4, 5, 7, 9, 13, 15 and 16 for the **North Alternate**, at Sites 2, 4, 7, 10, 15 and 16 for the **Crossover Alternate** and Sites 1, 10 and 15 for the **South Alternate**.

Based on the above mentioned receptor sites, the **North Alternate** would impact 296 residential receptors, 20 commercial receptors and 3 churches. The **Crossover Alternate** would impact 271 residential receptors, 19 commercial receptors and 2 churches. The **South Alternate** would impact 261 residential receptors, 20 commercial receptors and 1 church.

See Section 3.14 for cumulative and indirect impacts discussion.

3.2.4 Noise Abatement Considerations

According to the KYTC Noise Abatement Policy (February 2000), the KTYC will consider noise abatement measures for Sites 2, 3; 4, 5, 6, 7, 9, 12, 13, 14, 15 and 16 for the North, Sites 2, 3, 4, 7, 8, 10, 12, 14, 15 and 16 for the Crossover Alternate, and Sites 1, 2, 3, 6, 10, 12, 14 and 15 for the South.

Consideration was given to noise abatement measures such as traffic management (truck restrictions and speed reductions) and alteration of horizontal and vertical alignments. However, since this project will be a bypass route, traffic management in the form of truck restrictions and speed reductions would not be feasible. Vertical and horizontal displacement could compromise safety criteria and was also found not to be feasible. Since the aforementioned noise abatement measures are not feasible, the KYTC will consider structural noise barriers, such as walls, berms, privacy fencing and vegetative screening/landscaping to control noise levels around the proposed roadway.

According to the KYTC's criteria for noise barrier consideration, the following sites received initial consideration for barrier construction:

Residential

Category 1. Sites 4, 7, 9 and 16 for the North Alternate, Sites 2, 10 and 16 for the Crossover Alternate and Sites 1, 10 and 15 for the South Alternate fall into Category 1 noise barrier consideration since these sites approach, equal or exceed the residential NAC of 67 dBA Leq and increase noise levels by 10 dBA or more over existing noise levels.

Category 2. Sites 2, 3, 6 and 12 for the North Alternate, Sites 3, 8 and 12 for the Crossover Alternate and Sites 2, 3, 6 and 12 for the South Alternate fall into Category 2 noise barrier consideration since these sites approach or exceed the NAC of 67 dBA Leq but do not increase noise levels by at least 10 dBA over existing levels.

Category 3. Sites 5, 13 and 15 for the North Alternate and Sites 4, 7 and 15 for the Crossover Alternate fall into Category 3 noise barrier consideration because these sites have a noise level increase of at least 10 dBA over existing levels but do not approach, meet or exceed the residential NAC of 67 dBA Leq.

Commercial

Category 1. Site 14 for the North Alternate falls into Category 1 noise barrier consideration since the site equals the commercial NAC of 72 dBA Leq and increases noise levels by 10 dBA Leq over the existing noise levels.

Category 2. Site 14 for the Crossover and South Alternates falls into Category 2 noise barrier consideration since the site exceeds the NAC of 72 dBA Leq but does not increase noise levels by at least 10 dBA over existing levels.

3.2.5 Noise Abatement Findings and Recommendations

For a site to qualify for a noise barrier, it must be determined that the barrier will improve the predicted noise levels for people and be cost-effective. There are several criteria involved in barrier qualification: 1) the noise improvement must effect at least a 5dBA reduction in noise levels, 2) there must a greater than 3 dBA Leq increase between the No-Build and predicted build noise levels, 3)the barrier must be below the cost-effectiveness factor (CEF) of $250 per dBA reduction per person protected per dBA noise increase set by the KYTC, and 4) site characteristics must allow for barrier consideration based on construction feasibility and engineering judgment. The following summarizes the sites that were initially considered for barrier construction.

North Alternate

Although Sites 7 and 14 have predicted noise levels above the residential and commercial NACs respectively, no barrier design was performed since the buildings at these locations will be acquired if the North Alternate is selected. Sites 3, 6 and 12 were excluded from further barrier consideration since there was not a greater than 3 dBA Leq increase between the No-Build and predicted build levels. Sites 2, 4 and 9 also did not qualify for further noise barrier consideration because barrier modeling did not show a reduction of at least 5 dBA Leq in these areas. While Sites 5 and 13 met the noise measurement requirements, they did not qualify for further consideration based on their barrier's calculated CEFs.

Sites 15 and 16 not only qualified for barrier consideration based on their predicted noise reductions but were also found to be cost-effective. Therefore, if the North Alternate is considered for construction, it is recommended that a barrier be considered for sites 15 and 16. Although Site 6 did not qualify for further noise barrier analysis, residents represented by this receptor will receive some noise reduction benefits since they are in close proximity to Site 16.

Crossover Alternate

Sites 3, 12 and 14 were eliminated from further barrier consideration since there was not a greater than 3 dBA Leq increase between the No-Build and predicted build levels. Sites 2, 7, 8, 10 and 15 did not qualify for further noise barrier consideration because barrier modeling did not show a reduction of at least 5 dBA Leq in these areas.

Sites 4 and 16 not only qualified for barrier consideration based their predicted noise reductions but were also found to be cost-effective. Therefore, if the Crossover Alternate is selected for construction, it is recommended that a barrier be considered at sites 4 and 16. Although Site 5 did not qualify for noise barrier analysis, residents represented by this receptor will receive some noise reduction benefits since they are in close proximity to Site 4.

South Alternate

Sites 3, 6, 12 and 14 were eliminated from further barrier consideration since there was not a greater than 3 dBA Leq increase between the No-Build and predicted build levels. Sites 1, 2 and 15 did not qualify for further noise barrier consideration because the barrier modeling did not show a reduction of at least 5 dBA Leq in these areas.

Site 10 not only qualified for barrier consideration based on its predicted noise reductions but also because it is cost-effective. Therefore, if the South Alternate is selected for construction, it is recommended that a barrier be considered at Site 10.

See Section 4.1.1 for proposed mitigation measures.

Coordination with Public

It is important to note that the recommended barriers presented in this report are the result of preliminary study and consideration only. In determining the reasonableness of recommended barriers, the KYTC will hold meetings with affected residents to discuss noise barriers after an alignment is selected. After the desire of the majority of affected people is determined, the KTYC will make a final decision on specific noise barriers.

3.3 Aquatic Ecosystems [See Section 6, Reference 8]

3.3.1 Water Quality

The landscape of the project area is dissected with many surface streams and several subsurface streams. Most of the streams in the project area drain into Pitman Creek. Each watershed in the project area eventually drains to the Cumberland River. Pitman Creek is listed in the Kentucky Rivers Assessment as a Class 3 (Significant) stream in the area of fish resources and a Class 1 (Superior) stream in the area of wildlife resources. A bridge will be necessary where each

alternate crosses Pitman Creek. Water quality sampling was conducted at 17 sites along 15 streams throughout the project area in August 2001 and in April and May 2002. **(See Exhibit 12.)** The sampling results are shown in **Table 9**.

Sedimentation associated with construction activities can impair water quality by decreasing oxygen availability while increasing turbidity, suspended solids, conductivity, and nutrient load. An increase in sediment load and turbidity can have an effect on all components of a stream's ecosystem, including effects on water temperature, aquatic organisms, and benthic habitat. Temporary and permanent impacts on riparian habitats along the streams may also occur as a result of soil erosion and removal of stream bank vegetation. During the construction phase, erosion control measures will help prevent sediments and nonpoint source pollution from reaching the streams. Only minor and temporary stream impacts are expected from erosion and sedimentation for any of the build alternates.

Potential water quality impacts from pollutant loadings in highway stormwater runoff were analyzed according to FHWA's publication "Pollutant Loadings and Impacts from Highway Stormwater Runoff" (1990). This publication found that highway facilities with low to medium traffic volumes, i.e. average daily traffic volumes of approximately 30,000 vehicles or less, exert minimal to no impact on receiving waters. In the design year of 2030, average daily traffic volumes are projected to be between 21,000 and 26,000 vehicles for any of the three build alternates. **[See Section 6, Reference 4]** Based on these traffic volumes, the receiving waters in the project area should experience minimal impacts from highway stormwater runoff for any of the build alternates.

Cumulative and indirect impacts due to the proposed project also are expected to be minor.

3.3.2 Caves and Karst Features

Information from the Kentucky Department of Environmental Protection's Division of Water indicates that the project area traverses well-developed karst terrain, which includes numerous sinkholes, springs, caves and spring-fed streams. Additional detailed information was provided by one of the members of the Citizens Advisory Council's Environment Work Group. **[See Section 6, Reference 9]** The project area is considered hydrologically sensitive due to the karst nature of the topography.

Seven caves have been identified within the project area. **(See Exhibit 13.)** Neither the **North** or the **Crossover Alternates** would directly impact cave entrances. The **South Alternate** would impact the entrances to Caves B and G.

The South Alternate interchange with relocated U.S. 27 will have a ramp that will take or be located near the main entrances to Cave B. If construction closes the entrances, it will have a negative impact on the cave fauna, including cave crickets and bats. Every effort should be made during final design to avoid these entrances. Based on the geophysical survey done for the Relocated U.S. 27 project, the majority of Cave B is approximately 80 feet below the ground surface and should not be affected by the alignment. **[See Section 6, Reference 10 and 11]** The South Alternate also may impact Cave G. Cave G has a small entrance and no cave fauna were

observed at the opening. **If the South Alternate is selected for further implementation, further geotechnical studies may be necessary to determine the location and extent of the cave system.**

Several springs and numerous sinkholes were identified throughout the project area. **(See Exhibit 13.)** The **North Alternate** will impact two springs and four sinkholes, the **Crossover Alternate** will impact four springs and no sinkholes and the **South Alternate** will impact four springs and one sinkhole.

See Section 3.14 for cumulative and indirect impacts discussion.

See Section 4.2.1 for proposed mitigation measures.

3.3.3 Water Supplies

According to the Kentucky Geologic Survey, public water is supplied to around 82 percent of Pulaski County residents. Within the project area, public water is provided by the Western Pulaski Water District, Southeastern Water Association/Nelson Valley, Somerset Water Service, Science Hill Water Works, and the Eubank Water District. In areas not served by public supplies, the Kentucky Geologic Survey estimates that about 45 percent of households use wells and about 55 percent use other sources. Several domestic wells are located along the western portion of the project area.

Each alternate would impact one domestic well. However, the wells impacted are no longer the primary source water for the properties they serve. The homes are now on public water supply systems and use the wells only as a supplemental source of water. **(See Exhibit 13.)** The project is not located in a wellhead protection area nor are there any groundwater protection zones within the project area.

See Section 4.2.2 for proposed mitigation measures.

3.3.4 Streams and River Crossings

The **North Alternate** will involve 10 crossings of six blue-line streams. The **Crossover Alternate** will involve seven crossings of five blue-line streams. The **South Alternate** also will involve seven crossings of five blue-line streams. **(See Exhibit 14.) Table 10** provides information on the stream crossings by alternate, the type of structure used and its length at each crossing, and the length of any channel changes associated with a crossing. The project should not substantially affect the condition of the streams in or near the project area.

Running the contents of the original stream to a newly constructed culvert or channel will result in the loss of aquatic life in that portion of the old channel. New channel substrate may not initially provide the benthic habitat, cover and food sources aquatic organisms need to survive. Stream bank erosion may occur where soil is exposed. An increase in sediment load and turbidity can have an effect on all components of a stream ecosystem, including effects on water temperature, aquatic organisms, and benthic habitat.

See Section 3.14 for cumulative and indirect impacts discussion.

See Section 4.2.3, 4.2.4 and 4.3 for proposed mitigation measures.

3.3.5 Floodplains

There are two FEMA-designated floodplains in the project area. **(See Exhibit 13.)** This special designation refers to areas inundated by 100-year floods.

According to the Flood Insurance Rate Maps (16 July 1990), a Zone A Special Flood Hazard Area occurs at the beginning of the project (far west end) along an unnamed tributary of Fishing Creek. Each of the build alternates will encroach on approximately 1.5 acres in this previously disturbed floodplain. This area was previously disturbed by fill for the construction of the Cumberland Parkway. New disturbance limits for this project are not expected to exceed prior areas of disturbance.

The second FEMA-designated floodplain, a Zone AE Special Flood Hazard Area, exists along Pitman Creek. This designation also refers to areas inundated by 100-year floods with base flood elevations determined along the stream. All three of the build alternates encroach on this floodplain as well. Bridge piers will be located in the floodplain but no large fill activities are expected. Exact impacts on floodplains will be determined during final design.

Federal regulations require the KYTC to avoid or minimize highway encroachments within 100-year floodplains, where practicable. There are no feasible alternates in the project area that would not encroach on the floodplains in question. However, encroachments by all the build alternates are transverse and minimal. Cumulative and indirect impacts also would be minor.

A "No-Rise" certification and coordination with FEMA may be required for this project. As part of the No-Rise certification, modeling will be undertaken to ensure that constructing a bridge will have minimal impact on existing flood levels. Regulations limit the effect to a maximum of one foot. If the modeling determines that flood elevations will not change significantly, then no further evaluation will be needed and the encroachments are considered minimal. It is not anticipated that bridge or culvert construction will significantly affect flood levels. Due to the location of the bridge crossings, the project is not expected to encourage further development in the floodplains. A state Floodplain Construction Permit also may be required.

3.3.6 Wetlands

The National Wetland Inventory (NWI) maps were reviewed and wetland delineations were performed in 2001 and 2002. Twenty-nine wetlands were identified within the project area. **(See Exhibit 13.)** Wetlands A, D, K, T, CC, DD, II, LL, MM, OO, PP, and QQ have the potential to be directly impacted by the construction of at least one of the build alternates. Wetlands F, S, X, HH and NN are close enough to the proposed alignments to potentially be impacted indirectly by runoff from the new roadway. **Table 11** identifies each wetland's type, size and approximate area impacted. No rare or endangered plants or animals were identified in any of the wetlands.

The **North Alternate** will encroach on wetlands D, MM and QQ, impacting a total of approximately 0.23 acres of jurisdictional wetland area. While wetlands X, HH and NN are not directly impacted by construction, they are close enough to the alternate to potentially be indirectly impacted.

The **Crossover Alternate** will encroach on wetlands T and LL, impacting a total of approximately 3.62 acres of jurisdictional wetland area. While wetland S is not directly impacted by construction, it is close enough to potentially be indirectly impacted.

The **South Alternate** will encroach on wetlands A, K, T, CC, DD, II, OO, and PP, impacting a total of approximately 4.93 acres of jurisdictional wetland area. While wetlands F and S are not directly impacted by construction, they are close enough to potentially be indirectly impacted.

If it is necessary to fill a wetland, partial or total destruction of the wetland may occur. If a wetland is filled, loss of habitat and changes to natural drainage patterns will occur. Partial destruction of a wetland may include loss of habitat within and adjacent to the fill area. Temporary effects to remaining wetland areas may include increases in sedimentation and degraded water quality downstream from the construction area. Other wetlands in the area have the potential to be indirectly affected by stormwater runoff from disturbed areas. Impacts to a wetland's hydrology may eventually change the wetland's size, classification, plant composition, and soil characteristics. Best management practices, including erosion control plan, will minimize sedimentation and erosion.

Cumulative and indirect impacts would be ameliorated by replacement mitigation.

See Section 4.1.2 for proposed mitigation measures.

3.3.7 State-Listed Aquatic Species

The Kentucky State Nature Preserves Commission (KSNPC) identified the potential for the state threatened cave crayfish (*Orconectes australis*) and the state endangered fluted kidneyshell (*Ptychobranchus subtentum*) and purple lilliput (*Toxolasma lividus*) to occur within the project area. **(See Appendix B for Coordination.)** The cave crayfish inhabits subterranean streams and pools and is sensitive to changes in water quality due to disturbances within the watershed. None were found during field surveys conducted for this project. The state endangered fluted kidneyshell and the purple lilliput were listed by the KSNPC as occurring historically in Pitman Creek. Neither of these species were observed or collected during field surveys. Current judgment of occurrence suggests that the fluted kidneyshell has been extirpated from this stream, while all but one population of purple lilliput in Pitman Creek is listed as a historical record (no observation or collection since 1975).

See Section 3.4 for a discussion of state-listed terrestrial species.

See Section 3.5 for a discussion of federally-listed threatened and endangered species.

3.3.8 Wild and Scenic Rivers

According to the Kentucky Department of Environmental Protection's Division of Water, there are no Wild or Scenic Rivers or Outstanding Resource Waters located in the project area.

3.4 Terrestrial Ecosystems [See Section 6, Reference 8]

The project is located in an area that is increasingly becoming more developed, both residentially and commercially. Current land use in the project area is agricultural, residential and commercial plus four distinct types of habitats [open, forested, wetlands, and residential]. **Table 12** provides a breakdown of the amount of each habitat taken, by alternate. **Exhibit 15** shows the land uses and cover types. **Exhibit 13** shows the wetland locations.

Open areas account for the largest portion of the land taken for each alternate. They are used primarily for crop production and pasture. Idle, overgrown fields also are present. Residential/commercial areas account for the second largest portion of habitat impacted by each alternate. The residential areas consist mainly of single family homes. The forested areas, consisting of mixed deciduous and coniferous species, are interspersed throughout the project area and account for a small portion of the land taken by each alternate. Forested areas remain in undeveloped areas on knobs, upland ridges and hillsides. Wetlands account for the smallest portion of land taken for each alternate.

A total of 247 plant species, representing 86 families, were identified in the project area during field surveys in 2001 and 2002. No state-listed threatened or endangered floral species were listed for the project area, and none were identified during the field surveys.

The KSNPC identified the Rafinesque's big-eared bat (*Corynorhinus rafinesquii*) as state threatened and the Bewick's wren (*Thryomanes bewickii*) as a species of special concern. **(See Appendix B for Coordination.)** The bat's roost and winter sites include sandstone and limestone caves, rockhouses, clifflines and abandoned mines. **Exhibit 12** identifies the sites where mist netting was performed. Summer habitats include upland forests, bottomland forests and riparian corridors. The Bewick's wren is often found in brushy areas, thickets, and scrub/shrub areas in open country. Neither of these species was found during field surveys conducted for this project. **See Section 3.3.7 for a discussion of state-listed aquatic species and Section 3.5 for a discussion of federally-listed threatened and endangered species.**

One exemplary natural community, a floodplain ridge/terrace forest, monitored by the KSNPC, exists south of the project area along Pitman Creek. This area was last observed by the KSNPC in September 1987. This area consists of a tall, dense canopy, while the understory is tall and well developed. All proposed alternates for this project are well north of this area and should have no impact on this sensitive ecosystem.

No state champion trees listed on the Kentucky Division of Forestry's "Kentucky's Big Tree" list occur within the project vicinity.

The construction of the project will initially disturb plant communities and wildlife habitats and will result in an irreversible loss of habitat due to the conversion of open, forested, wetland and residential area to pavement and adjacent roadway right of way. The proposed alternates have the potential to split habitats, decreasing habitat necessary to support certain species populations and reducing interactions with other communities. Habitat fragmentation and the loss of vegetation may impact faunal species that depend on the vegetation for food and shelter. Loss of vegetation, along with the noise and dust from construction, may force some wildlife species to move to other habitats that are capable of meeting their needs. There is the potential for the number of animal species and total biomass to be reduced if a build alternate is chosen.

While habitat fragmentation could occur due to the new bypass, habitat fragmentation in the project corridor has previously occurred, and is continuing to occur, due to residential and commercial development and agricultural activities.

During construction, large areas of excavated soil will be subjected to erosion. Impacts on soil, and erosion associated with construction activities, will decrease the productivity of the area. The use of heavy equipment to move soil and existing vegetation disrupts the natural drainage permeability.

In addition, impacts to flora and fauna may occur if construction of the roadway facilitates the spread of invasive species. Highway corridors provide opportunities for the movement of invasive species through the landscape. When native species are removed, invasive species have the opportunity they need to flourish. Invasive plants can be introduced into areas during spraying and mowing or through movement of vehicles and construction equipment. Use of mulch, imported soil or gravel, and sod can also facilitate the spread of non-native species. Revegetation with native floral species will help stabilize construction areas and minimize introduction of invasive species.

See Section 3.14 for cumulative and indirect impacts discussion.

See Section 4.1, 4.2 and 4.3 for proposed general mitigation measures.

3.5 Federally Threatened and Endangered Species [See Section 6, Reference 8]

Coordination with the U.S. Fish and Wildlife Service (USFWS), the Kentucky Department of Fish and Wildlife Resources and the Kentucky State Nature Preserves Commission (KSNPC) was undertaken to identify federally-listed threatened or endangered species and designated or proposed critical habitat that could be present within the project area. **(See Appendix B for Coordination.)** The USFWS identified the gray bat (*Myotis grisescens*), the Indiana bat (*Myotis sodalist*) and the little wing pearly mussel (*Pegias fibula*) as federally endangered and potentially occurring in the project area.

Mistnet surveys for both bat species were conducted on six occasions in August 2001 and May and June 2002. **(See Exhibit 12.)** No individuals from either species were collected at any of the mistnetting sites. A mussel survey was conducted in Pitman Creek in May 2002. No little wing pearly mussels were found during this survey. Mussels found in Pitman Creek appeared to

be doing poorly, likely due to sedimentation from construction and cattle-grazing in Pitman Creek tributaries. Habitat conditions near the potential bridge-crossing sites were not conducive to this sensitive species.

There were no critical habitats, monitored natural areas or federally threatened species identified within the project area.

See Section 3.3.7 for a discussion of state-listed aquatic species.

See Section 3.4 for a discussion of state-listed terrestrial species.

See Section 4.1.3 for proposed mitigation measures.

3.6 Cultural Resources

In accord with the requirements of Section 106 of the National Historic Preservation Act and Section 4(f) of the Department of Transportation Act, several surveys were undertaken to identify the cultural resources within the project area. Field investigations of the project area included an evaluation of archaeological sites and historic standing structures.

3.6.1 Historic Structures or Districts [See Section 6, Reference 12]

A detailed survey of the project corridor identified 93 historic sites. **(See Exhibit 16.)** The State Historic Preservation Officer (SHPO) has determined that five of these sites (Sites 7, 45, 46, 78 and 83) may meet National Register criteria but that the project will have no effect on any historic structures listed on or eligible for listing on the National Register of Historic Places. **(See Appendix B for Coordination Correspondence.)**

3.6.2 Archaeological Sites [See Section 6, Reference 13 and 14]

An archaeological overview of the project corridor was conducted in November 2001. **[See Section 6, Reference 13]** There are five previously recorded sites within the project corridor. For purposes of protecting these sites, their locations are not shown in this report. None of the sites would be impacted by any of the build alternates. **Exhibit 17** shows archaeological site probability zones associated with each build alternate.

On 25 March 2003, consultant archaeologists completed field work for the Phase I archaeological survey of the Preferred Alternate (North Alternate). **[See Section 6, Reference 14]** A total of approximately 780 acres, encompassed by the proposed right of way (ROW), was surveyed between 13 January 2002 and 25 March 2003. The entire project area was visually inspected to identify archaeological sites. Areas of heavy disturbance and/or slopes greater than 20 percent were visually inspected but not subjected to shovel test probe investigations. The remaining acreage of the project area was investigated through the excavation of shovel test probes and/or visual inspection of plowed fields.

As a result of the survey, a total of 49 archaeological sites, 18 prehistoric isolated finds, and a historic cemetery were identified within the ROW. **Table 13** summarizes the frequency of sites by site types and lists the field numbers of sites that will and will not require additional Phase II archaeological investigations. **Table 14** provides preliminary site descriptions, management recommendations, and National Register of Historic Places evaluations for each of the cultural resources identified. No additional work will be necessary for any of the isolated finds. For purposes of protecting all the archaeological sites, their locations are not identified in this report.

The only high probability area located outside the area of the North Alternate also was surveyed during this period. Two sites (Field Sites 48 & 49) were recorded for this high probability area. No additional archaeological research is recommended for either site and neither is considered eligible for inclusion on the National Register.

Based on field investigations and preliminary analysis of the artifacts recovered, a total of potentially seven archaeological sites will require additional Phase II investigations. These include four prehistoric open air habitation sites (Field Sites 9, 14, 30, 46) and two historic house sites with prehistoric components (Field Sites 4 and 10) and the Sweeney Cemetery. A total of more than 1800 artifacts were collected from all resources documented during the current survey. An earlier (2002) historic architectural survey was conducted in the project area. **[See Section 6, Reference 12]** Additional architectural descriptions of structures were provided when they were directly associated with an archaeological site.

See Section 4.1.4 for proposed mitigation measures.

3.7 Socioeconomic Impacts [See Section 6, Reference 15]

3.7.1 Land Use

Most of Pulaski County is rural, and Somerset is the predominant urbanized area in the county. Most of the project corridor is rural with urban land uses encroaching north from Somerset. **(See Exhibit 15.)**

Rural land uses are characterized by crop and pastureland. Major crops and farm production within the project corridor include corn, wheat, soybeans and tobacco. The chief livestock in the area are cattle and hogs.

Urban land uses include residential, commercial, retail trade and personal service businesses, as well as public and semi-public facilities such as the airport, marinas, and cemeteries. One railroad line, the Norfolk-Southern Corporation line, closely follows U.S. 27 in the project corridor. This freight line typically carries coal, lumber, iron ore, chemicals, paper and automobile parts. The J.T.Wilson Field Airport, located about three miles south of the center of Somerset and outside the project corridor, is not served by commercial airlines. **(See Exhibit 2.)**

The city of Somerset has produced a report entitled *Somerset Comprehensive Plan 2000* **[See Section 6, Reference 16]** and a future land-use map (but no existing land-use map) that utilizes zoning to designate a variety of land uses. **(See Exhibit 18.)** Pulaski County, however, does not

have a comprehensive plan or land-use maps. City and county officials coordinate development issues informally. Residential and commercial growth in and around Somerset has proceeded in an unstructured way with residential growth occurring primarily to the north and southwest and commercial development occurring along U.S. 27 and to a lesser extent along KY 80.

Since the project corridor lies outside the city limits of Somerset, the community structure of the city itself will not be impacted by any of the build alternates. The *Somerset Comprehensive Plan 2000* shows residential development over the next 10 years occurring north of the city along U.S. 27, KY 1247 and KY 39 with business development advancing especially along U.S. 27 north. Annexation by the city is expected to occur gradually. Providing a northern bypass would be compatible with this plan.

The population in the county grew by 13.5% over the last 10 years and in the city by 6%. This is primarily due to an influx of individuals and families interested in retirement opportunities, recreational pursuits at Lake Cumberland, regional medical services and educational/cultural outlets in Somerset. In addition, city and county officials along with the area's industrial development foundation have been working to develop a systematic plan for industrial development in and around Somerset, which includes the designation of a new industrial park and a technology park near the intersection of KY 80 and KY 461 east of Somerset.

Regarding future demand, it appears population in the county will continue growing through 2006 at a rate of about 6%. Thus, placing an alternate farther north of Somerset to allow growth and development in the future would be beneficial, from a comprehensive planning and development standpoint.

Pulaski County is part of a multi-county regional planning area managed by the Lake Cumberland Area Development District (LCADD). The organization assists local planners in studying growth patterns and projecting economic development and other land-use trends, as well as holding public meetings regarding future land-use impacts.

Interviews with local officials indicated that all are well aware of the bypass proposals being studied by the KYTC, and feel that such an east-west bypass north of Somerset is important to the future of the city and county. Many also believe that while the bypass is important for local travel needs, many also think it will assist through-travel needs on the Cumberland Parkway and KY 80. Most members of the Citizens Advisory Council, including the County Judge Executive and the Mayor, believe that a northern bypass around Somerset is needed.

No adverse impact is expected for any alternate on current or projected growth trends reflected in local plans and mapping or on projected industrial and economic development.

3.7.2 Community Impact Assessment

While Somerset and nearby small towns all lie outside the project corridor, schools, churches, day-care facilities, and emergency services that contribute to community cohesion are present. None of these facilities will be taken or otherwise adversely affected by any of the build alternates. Accessibility and traffic patterns, overall, should be improved.

Neighborhoods

No changes in the physical or social character of Somerset are expected with the project. However, some change in social character of residential neighborhoods would occur if the alternate chosen goes through or otherwise impacts established neighborhoods. Each of the alternates would go through several neighborhoods, with the South going through the most at seven and the Crossover and North going through six and five, respectively. **Exhibit 15** shows the approximate location of the neighborhoods that would be affected.

Currently, major residential subdivisions in the study corridor include: the Camelot subdivision with homes ranging in price from $100,000 to $250,000, located between U.S. 27 and KY 1247 just south of the South Alternate; the Twin Lakes and Oak Leaf subdivisions with homes priced above $200,000 located on the east side of KY 1247 and south of the South Alternate; and the Bent Creek, Woods Edge and Eagles Nest subdivisions, all with high-priced homes, situated east of KY 39 and north of the Crossover and South Alternates.

The North Alternate lies north of these major subdivisions and the Eagles Nest Country Club and subdivision. Most open land south of the North Alternate and adjacent to existing subdivisions is currently included in planned residential subdivision proposals being implemented by local developers. In addition, smaller subdivisions and individual homes of varying value are scattered throughout the project corridor.

A major effort of public involvement activities conducted during the project study were focused on identifying the negative impacts on community cohesion and maintaining neighborhoods and subdivisions with only minor disruptions to community structure, housing configuration and travel patterns. Neighborhood leaders, clergy, school officials, and government leaders among others were consulted specifically about community disruptions. The Somerset Citizens Advisory Council's Neighborhood Work Group studied potential displacements and quality of life issues. This Work Group concluded that the North Alternate posed the fewest negative impacts on neighborhoods, and they recommended the North Alternate to the Advisory Council. While some degree of anxiety was expressed about which subdivisions would be affected, public sentiment from the Somerset Citizen's Advisory Council and from local residents clearly favors the North Alternate.

Churches and Cemeteries

Although there is some encroachment by the North Alternate on the Sweeneys Chapel property, which includes a church and cemetery, neither the church nor any of the graves will be taken. See Section 3.6.2 for more details about this property. No churches or cemeteries will be impacted or taken by any of the other build alternates.

Travel Patterns

Travel patterns in Pulaski County and Somerset are based largely on local interests such as the commute for employment, shopping for food and merchandise, shipping and receiving for light industrial outlets and recreational or tourism pursuits. Interviews with local community and

business leaders were confirmed by the KYTC traffic counts that the heaviest traffic volumes in the area are on U.S. 27 north and south through Somerset.

Those individuals commuting outside of the county for jobs primarily use KY 80 and KY 461 northeast to I-75 and Richmond, KY, as well as Lexington, KY. There may be some exchange of commuters also between Somerset and London, KY, about 35 miles to the east at I-75. However, Somerset itself is a regional destination for jobs at the medical center, service outlets, manufacturing plants and at food and beverage outlets.

Another major travel focus for Pulaski County is the tourism industry. Lake Cumberland and natural areas in southern Kentucky draw visitors from northern states such as Michigan, Ohio, and Indiana and other states such as West Virginia and Tennessee. Those traveling from the north, east and west currently must use U.S. 27 through Somerset to reach resort locations.

Lacking a full belt-line or bypass highway all the way around Somerset, most travelers having the city as a destination must travel through town on U.S. 27 and/or KY 80. While secondary roads also are used in these areas to travel into Somerset, ultimately most offices and business outlets are located along U.S. 27. Thus, it carries the heaviest traffic volumes.

The KY 914 bypass southeast of Somerset is utilized by some commuters and trucking firms to reach commercial and industrial outlets on that side of the city. In addition, a bypass is planned for construction on the southwest side of the city. This Phase I project study for a northern bypass would give the city a complete circle belt-line highway or bypass and could divert some of the traffic volumes from U.S. 27 through town.

U.S. 27 is also the main corridor through Pulaski County for north/south through traffic. It has been widened to a six-lane highway to accommodate traffic. Even so, KYTC shows the greatest frequency of fatal crashes between 1997 and 1999 to be on U.S. 27 through the county. **[See Section 6, Reference 17]**

Regarding safety and traffic volume reduction, the completion of a northern freeway bypass coupled with the completion of a southwestern bypass of Somerset (another separate project now being implemented) and the existing KY 914 bypass should aid in reducing traffic volumes and accident rates along KY 80 and U.S. 27 through Somerset. Commuter traffic from residential areas to and from jobs as well as through-traffic would have better access to destinations within and outside the county.

East-west traffic through the county utilizes the Cumberland Parkway/KY 80, which about evenly divides the land area. There is some travel, projected to increase, along KY 80 to the new industrial and technology parks on KY 461 near KY 80 east of Somerset. Industrial growth in these parks is expected but is proceeding at a moderate rate, particularly with the current economic slowdown.

However, growth of commercial and residential areas along KY 80 through Somerset has increased rapidly over the past 10 to 15 years and has slowed traffic somewhat with traffic

signals at intersections. Some local community and business leaders feel that KY 80 no longer serves the city as a viable bypass for through traffic.

Highway projects can affect access to public services and facilities. In the project study area, schools, parks, churches, businesses, shopping and emergency services were evaluated. None of these facilities would be taken by any of the build alternates.

Growth and Development

Population growth is predicted to occur with or without the project and with any alternate selected. There may be potential positive impacts of the project with regard to future residential and business growth, particularly along U.S. 27 North and KY 39 North, as well as business access, transportation service within Somerset and the county and relief of traffic congestion especially along U.S. 27 through Somerset. As part of another project, U.S. 27 north of KY 80, is already being relocated to the west to correct roadway deficiencies and accommodate business growth outside an adjacent railroad corridor.

While residential development is expanding inside the project study area, it also is occurring southwest of the city near Lake Cumberland and is projected to continue over the next 10 years. Water lines are being extended into the county to meet existing residential needs, and these same water lines are expected to encourage additional residential development.

The Citizens Advisory Council's Business Work Group found that the North Alternate allows for the future expansion of Somerset better than any of the other alternates. The number of accessible and developable land between the North Alternate and the Somerset city limits is more than two and one-half times that of any other alternate. They felt that allowing development to occur within the bypass encourages compact and controlled growth. The Government Work Group also found the North Alternate clearly allows for the potential growth of Somerset better than any of the other alternates.

Downtown Area

The downtown business center, located on old KY 80 (also called Mt. Vernon Street) just east of U.S. 27 **(See Exhibit 2)**, is primarily made up of banks, county and city offices, a courthouse, other service outlets, antique stores and several small restaurants. As in many towns, the downtown business district struggles to remain viable. There are empty store fronts along several streets.

The downtown area is centered on the intersection of Main and Mt. Vernon Streets with an attractive fountain/park inside a large traffic circle. The county courthouse is located across from it on Main Street. Local programs to revitalize downtown businesses include the Main Street Program and state funding through the Kentucky Renaissance Program for streetscape and parking improvements. Some state-funded housing projects also are underway for downtown development. **[See Section 6, Reference 18]**

Business and Service Centers

Expansion in business operations has progressed mainly along U.S. 27. Many national chain restaurants and motels, with a total of about 1,100 rooms for visitors, have located in Somerset. Most family-owned restaurants have gone out of business in recent years. **[See Section 6, References 18 and 19]** Local officials would like to see development occur along U.S. 27 north of Somerset and at interchanges along a northern bypass. They also want business growth to be broader than just gas stations and fast- food restaurants. **[See Section 6, References 20 and 21]**

Commercial and business accessibility for suppliers and customers was evaluated. While shipping and receiving at local industrial outlets will be improved with a northern bypass, the most active industrial parks already are located either along the KY 914 bypass or near the interchange of KY 80 and KY 461, avoiding some of the travel through the higher traffic areas of Somerset.

Delivery truck traffic to local businesses would remain relatively high along U.S. 27 regardless of which alternate is chosen.

None of the build alternates should alter the character of any existing local facilities or services. Most businesses and services are located on U.S. 27 through town and in the downtown area along Main and Mt. Vernon Streets and other side streets. The medical complex is located south of KY 80 and west of U.S. 27 within the city limits and should not be adversely affected by the project. **(See Exhibit 2.)**

Economic Vitality

The economic base of the Somerset area displays wide balance with a particularly strong medical and tourism economy, uncommon in predominantly rural areas of this population size. Somerset and Pulaski County provide economic and recreational services that attract visitors from a wide area. An economic development effort has been underway to broaden the manufacturing base of the area and to attract more high tech companies.

The top earnings in Pulaski County are the service industry produced $163 million, manufacturing $139.5 million, government $118.2 million, retail trade $92.7 million, transportation and public utilities $61.9 million, construction $43.9 million and wholesale trade $42.3 million, and agriculture $35.2 million. **(See Table 15.)**

The following subsections provide a summary of important segments of this economic base.

Agriculture. Agriculture, primarily pastureland, is the predominant land use in the county. In 2000, Pulaski County ranked second in the state out of 120 counties for hay production, 20th for burley tobacco production, 38th for corn and soybeans and 53rd for wheat. The county ranked third in the state for the number of cattle, calves, and beef cows, 15th for milk production and 42nd for the number of hogs and pigs. A total of $35.2 million was recorded in agricultural cash receipts in the county for 2000, including $20.9 million for livestock and $14.2 million for crops.

Agriculture traditionally had been about 25 percent of the county economy. Today it accounts for only about 10 percent.

Industry. Major light industrial operations locally center on metal stamping and aluminum wheel production for automotive needs; plumbing and bathroom facilities; food services; wood products, sheet metal and metal chain production; glass production (General Electric); house boat manufacturing and clothing manufacturing. Several trucking firms operate in Somerset, and a large active limestone quarry is located east of Somerset at the intersection of KY 914 and KY 80.

There are five industrial parks in Somerset and Pulaski County. The oldest industrial park, the Pulaski County Industrial Park at the southeast city limit of Somerset on KY 1247 just inside the KY 914 bypass was established in the 1970s. The Lake Cumberland Commerce Complex lies in the same area but in the county just off KY 914. Another small industrial area lies just north of KY 80 between U.S. 27 and KY 1247, near KY 1575. The Valley Oak Commerce Center and the Technology Center are located northeast of Somerset on KY 461, a short distance from the intersection of KY 80 and KY 461. **(See Exhibit 19.)**

There had been about an equal rate of expansion in jobs and cutbacks over the past five years in Somerset and Pulaski County until the past 16 months, when one major industrial operation, Tecumseh - which employed 1,500 at one time to produce air conditioner compressors for cars and home use - closed along with three other companies. Several other operations have expanded by several hundred jobs each that kept these losses from being more severe.

Existing industrial parks within Somerset are projected to expand significantly into the county in the future, particularly the Lake Cumberland Commerce Complex and the new Valley Oak Commerce Center and The Technology Center.

Commercial. Local retail is an important part of the Somerset and Pulaski County economy. In recent years, local retail earnings in Pulaski County have been approximately $90 million annually. Within the retail sales sector, the sale of motor vehicles was highest in 2001 followed by the sales of general merchandise and food and beverages.

Medical. Another important part of the economy for Pulaski County and Somerset is the medical field, a large component of the service sector which in 1999 showed the top earnings in the county at $163 million. Over the past 10 years a major expansion has been experienced in medical facilities to serve heart, kidney and other patients within a 100-mile radius of Somerset. The medical sector is expected to see even greater expansion as more senior citizens move into the area.

A number of medical professional buildings have been constructed near the Lake Cumberland Regional Hospital, located just south of KY 80. and west of U.S. 27 within the city limits. **(See Exhibit 2.)** Lake Cumberland Regional Hospital is part of a regional chain of hospitals in Kentucky.

Tourism. Another large sector of the Pulaski County and Somerset economy is the tourism industry. Lake Cumberland and several major state parks and nature areas lie to the south, southeast and southwest of Somerset in Pulaski County. One branch of Lake Cumberland lies within southern Pulaski County and is the destination of tourists from as far away as Michigan, Indiana, Ohio, West Virginia and Tennessee.

This industry accounts for a large portion of retail sales in the area as well as motel use. Associated with the tourism industry are several houseboat construction businesses located in Somerset. Visitors to Lake Cumberland rent houseboats for use on the lake, others, living in the area, own houseboats. Some high-end cost houseboats are produced for celebrities and the wealthy. For example, designs of larger houseboats are based on full-size homes and paddle wheel riverboats.

3.7.3 Bypass Effects

There are positive and negative aspects associated with bypassing Somerset. Construction of a northern bypass is expected to have positive effects by lowering traffic volumes on KY 80 through Somerset and by providing free flow for east-west through-traffic, which now must travel on KY 80 through town. As the area continues to grow, especially to the north, it will be more important to provide a bypass corridor for ease of travel locally and regionally for the commute to jobs in Richmond and Lexington and elsewhere. Traffic congestion on roads that intersect KY 80 within Somerset also is projected to be reduced.

When traffic is taken away from one location (KY 80) and placed in another location (bypass), the indirect effect is the loss of customers for those businesses located along KY 80 and to a lesser degree to those businesses located on roads that intersect with KY 80. Fast food restaurants, service stations and motels are the businesses most likely to experience a reduction in their customer base.

Field observations and traffic projections suggest that there still should be a plentiful supply of customers to businesses on both roads and that any lost business would be negligible. Two businesses that likely would have noticed the largest percent decrease in customers, a gas station on the northeast corner and a restaurant on the southwest corner of the U.S.27/KY 80 intersection, closed before this study was completed. A bank and another business that do not rely on drive-by customers occupy the other two corners of this intersection. Other businesses within view from KY 80 include a grocery store, quarry, lumber yard, day-care facility, and furniture refinisher. These businesses do not rely on "impulse purchases" and will likely experience a smaller percentage of lost business, if any, by having some traffic moved from KY 80 to a northern bypass. Furthermore, the developable land available to all three Build Alternates should encourage new businesses near interchanges. Losses experienced by existing businesses should be offset by sales at these new businesses.

3.7.4 Tax Base Effects

Construction of a Somerset Northern Bypass would remove assessed land and buildings from the tax base. Depending upon the alternate, between 515 to 572 acres would be converted to

transportation right-of-way. Each build alternate would have a short term adverse effect on local property tax receipts. A tax revenue loss analysis was prepared for each taxing district in Pulaski County. Losses of property tax revenues to Pulaski County due to right-of-way requirements are less than 2/10 of one percent for any of the three build alternates. The **Crossover Alternate** would create the largest property tax revenue loss at $20,685. **(See Table 16.) The South Alternate** would create a property tax revenue loss of $14,426. **(See Table 17.)** The **North Alternate** would result in the smallest property tax revenue loss at $13,968. **(See Table 18.)**

Neither property values nor property tax rates in the county are likely to be impacted negatively due to the construction of any bypass alternate. The area has open and developable land that is available for residential and business relocations. New development may offset initial losses of property tax caused by displacements.

3.7.5 Replacement Housing and Available Commercial Facilities

The Conceptual Stage Relocation Report **(See Appendix C)** evaluated available housing and commercial facilities. Comparable housing within a similar price range and area appears to be more than adequate to accommodate residents who may become displaced by one of the project alternates. An ample supply of vacant land and plans by developers to construct more houses and commercial buildings in the immediate area should provide more, rather than less, available housing at the time when residents would need to relocate. The only price range where residents may encounter some difficulty in obtaining available housing is $10,000 to $19,900.

In 2000, the total housing units in Pulaski County was 27,181. A total of 63.5 percent were owner-occupied, 20.1 percent were renter-occupied, and the remaining 16.4 percent were vacant. **(See Table 19.)** For comparison, Pulaski County housing figures from 1990 are owner-occupied, 40.8 percent were renter-occupied, and the other 11.0 percent were vacant. **(See Table 20.)** The total housing units in Kentucky in 2000 was 1,750,927. In addition, 64.3 percent were owner-occupied, 26.5 percent were renter-occupied, and the remaining 9.2 percent were vacant. **[See Section 6, Reference 22]**

In 2000, the most common housing type in the county of Pulaski was a detached unit constituting 63.3 percent of the total housing units. Somerset's most common housing type was a detached unit consisting of 58.2 percent of the total housing units. The most common housing type in Kentucky was a detached unit constituting 66.0 percent of the total housing units. Mobile home was the second most common housing type in Pulaski County and Kentucky constituting 23.1 percent and 14.1 percent of the total housing units, respectively.

In 2000, the median value of owner-occupied housing was $74,100 for Pulaski County. Somerset's median owner-occupied home value was $63,100. The median value of owner-occupied housing was $86,700 for Kentucky.

Data from the Somerset-Lake Cumberland Association of Realtors was used to estimate housing availability within the area. **Table 21** shows the number of houses displaced by each build alternate, classified by price range. Estimating the number of houses available is a function of

the number of houses on the market at a specific time. The time frame used for this study covered July-October of 2002.

U.S. 27 is the corridor of most commercial development in Somerset. Most businesses along this highway already will be contending with relocation needs prior to the construction of a northern bypass, since U.S. 27 north of Somerset is being relocated to the west of its present corridor, as part of another project.

In addition, the project should have little negative effects on economic development and the location of light industry in the area. Most industrial parks are located outside the project corridor, and development will proceed as currently planned. However, there may be some relocation impact on a small industrial area between U.S. 27 and KY 1247 and near KY 1575 just north of KY 80 if the South Alternate is selected for construction.

See Section 3.14 for cumulative and indirect impacts discussion.

3.7.6 Relocations and Displacements

Residential displacements by housing type and market value are identified in the Conceptual Stage Relocation Report. **(See Appendix C.)**

Business/Commercial

Business displacements have been identified for each of the three build alternates under consideration. These businesses and their market value are shown in **Table 22**. Business displacements could reach up to 8 for the **North Alternate**, 6 for the **Crossover Alternate**, and 5 for the **South Alternate**.

Residential

Table 23 summarizes residential displacements by housing type (i.e. single family, multi-family, and mobile homes).

The **Crossover Alternate** displaces the most residential housing units with up to 109 single-family units and 9 mobile homes. The **North Alternate** displaces up to 66 single-family units and 10 mobile homes, and the **South Alternate** displaces up to 64 single-family units and 8 mobile homes.

Although one resident in the project area attended a meeting in a wheelchair, discussions with residents, windshield surveys, and meetings with the Somerset Citizens Advisory Council did not identify any unusual problems that might affect physically challenged residents if the Somerset Northern Bypass is constructed.

In accord with the Uniform Assistance and Real Property Acquisition Act of 1970 (as amended), a program of relocation assistance and payment is available through the Kentucky Transportation Cabinet. Policies implemented by the KYTC attempt to ensure that displaced persons receive

fair and equitable treatment without discrimination and that the construction of any highway project designed for the benefit of the public will not result in undue hardship to any individual or group. Payments covering moving costs and supplemental housing and advisory assistance services are offered in addition to the Commonwealth's payment for real property. If comparable housing is unavailable at the time of displacement, relocation payments based on Last Resort Housing may be necessary. For this proposed project, the need for Last Resort Housing is not anticipated. Sufficient open land and available housing exists to accommodate all relocation needs within the immediate vicinity of the project corridor.

It appears that relocatees can be relocated into safe and sanitary replacement housing, within their financial means and without regard to race, color, religion, sex, national origin, or handicap if sufficient lead-time is provided. Many recently constructed homes are one story, and developers are aware of the influx of retirees and elderly to the Somerset area. Consequently, amenities attractive to an elderly population (less reliance on stairs, larger doorways and halls for those using walkers, etc.) are being incorporated into new construction.

None of the build alternates pose insurmountable relocation problems related to finding affordable property in the immediate vicinity for local businesses. All of the potentially displaced businesses find that most of their customer base is located in the immediate vicinity of their business. Consequently, being able to relocate nearby is an important factor if these businesses are to continue operating. The business expected to experience the largest relocation cost would be Warner Fertilizer if the South Alternate is constructed. Warner Fertilizer is a fairly large operation with frequent visits by vehicles to load and unload products. It also relies on adjacent rail transport for incoming shipments of bulk fertilizer. A large enough parcel to accommodate large vehicle turning radii and vehicle storage is needed. In relation to community cohesion, the displacement of the Nelson Valley Grocery would have some concern for residents living in that part of the project corridor, because the next closest comparable grocery store is approximately three miles away. This inconvenience is somewhat offset by the fact that virtually all the Nelson Valley Grocery customer base must drive to reach this store. There are no nearby neighborhoods to provide walk-in traffic. **(See Exhibit 19.)**

The Chevron Quik Stop, that would be displaced by the North Alternate, provides customers with the convenience of being able to purchase select food items while refueling their vehicles. This business primarily serves persons living near the soon-to-be relocated U.S. 27. While the necessity of this business to remain within the project area is lessened because of the number of other gas stations located on U.S. 27, the intersection of Bodie and U.S. 27 is the location of several other small businesses that do serve residents in this portion of the project area. No other businesses potentially displaced by the North Alternate provide a unique service or possess a high degree of necessity for nearby residents.

3.7.7 Farmland

Agriculture, primarily pastureland, is the predominant land use in the county. In 2000, Pulaski County ranked second in the state out of 120 counties for hay production, 20th for burley tobacco production, 38th for corn and soybeans and 53rd for wheat. The county ranked third in the state for the number of cattle, calves and beef cows, 15th for milk production and 42nd for

the number of hogs and pigs. A total of $35.2 million was recorded in agricultural cash receipts in the county for 2000, including $20.9 million for livestock and $14.2 million for crops. The average farm size is about 150 to 200 acres.

Thus, the agricultural sector is not responsible for producing the top earnings in Pulaski County. For 1999, the service industry produced $163 million, manufacturing $139.5 million, government $118.2 million, retail $92.7 million, transportation and public utilities $61.9 million, construction $43.9 million and wholesale trade $42.3 million.

Agricultural earnings of just $35.2 million reflect a trend toward the urbanization of jobs over the second half of the past century. Most farmers today hold second jobs to produce a viable income. Historically, agriculture had been about 25 percent of the county economy. Today it accounts for only about 10 percent. **[See Section 6, Reference 18]**

Formal consultation with the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) has been completed for compliance with the Farmland Protection Policy Act of 1981**.** The Land Evaluation and Site Assessment (LESA) for this project is contained in **Appendix D**. Rating criteria have been applied and evaluated using the AD-1006 Farmland Conversion Impact Rating Form. This form contains a rating value for each site evaluated based on the relative value of farmland impacted compared to similar farmland within the county.

For this project, a "site" is defined as the total required, permanent right-of-way for an alternate alignment. Three alternates—the North, Crossover, and South—were evaluated. The **North Alternate** would eliminate 63 acres of prime farmland and 18 additional acres of statewide and locally important farmland. The **Crossover Alternate** would eliminate 48 acres of prime farmland and 37 additional acres of statewide and locally important farmland. The **South Alternate** would eliminate 38 acres of prime farmland and 41 additional acres of statewide and locally important farmland.

NRCS value scores show that the **North Alternate** has a slightly higher value, 96.5, compared to the **Crossover Alternate**, 95.8, and the **South Alternate**, 95.4. According to the state and federal guidelines for interpreting these scores and determining the level of farmland protection warranted, total scores of 160 or less require only a minimal level of consideration for protection and do not require the consideration of additional alternates.

In terms of the site assessment criteria, there is little distinguishable difference between the bypass alternates. Based on this analysis, it can be concluded that the project's impact on farmland, regardless of the alternate, is not great, and that protection of this farmland should not override the need for the project.

Thus, while there is more agricultural land taken with the North Alternate, there will be little negative impact on agriculture generally since there is adequate open land in the region for farming.

3.8 Environmental Justice [See Section 6, Reference 15]

It is the policy of the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) to actively ensure nondiscrimination under Title VI of the *1964 Civil Rights Act* in federally funded activities. Under Title VI and related statutes, each federal agency is required to ensure that no person is excluded from participation in, denied the benefit of, or subjected to discrimination under any program or activity receiving federal financial assistance on the basis of race, color, national origin, age, sex, disability, or religion.

On February 11, 1994 President Clinton signed *Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*. The executive order requires that each federal agency shall, to the greatest extent allowed by law, administer and implement its programs, policies, and activities that affect human health or the environment so as to identify and avoid "disproportionately high and adverse" effects on minority and low-income populations.

In April 1997, the U.S. Department of Transportation (USDOT) issued the USDOT *Order on Environmental Justice to Address Environmental Justice in Minority Populations and Low-Income Populations (DOT Order 5610.2)* to summarize and expand upon the requirements of *Executive Order 12898* on environmental justice. The order generally describes the process for incorporating environmental justice principles into all USDOT existing programs, policies, and activities.

The three fundamental environmental justice principles are:

1) To avoid, minimize, or mitigate disproportionately high and adverse human health or environmental effects, including social and economic effects, on minority and low-income populations.

2) To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process.

3) To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

Minority Definition:

The *U.S. DOT Order 5610.2* defines "minority" in the definitions section of its appendix and provides definitions of the four minority groups addressed by *Executive Order 12898*. These groups are:

1) Black – a person having origins in any of the black racial groups of Africa.
2) Hispanic – a person of Mexican, Puerto Rican, Cuban, Central or South America, or other Spanish culture or origin regardless of race.
3) Asian American – a person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands.

4) American Indian and Alaskan Native – a person having origins in any of the original people of North America and who maintains tribal affiliation or community attachment.

Low-Income Definition:

The FHWA Order defines "low-income" as a "person whose household income is at or below the Department of Health and Human Services poverty guidelines." The Department of Health and Human Services poverty guidelines for a family of four is $17,650.

3.8.1 Protected Populations and Meaningful Participation

In 2000, 2.5 percent of the population of Pulaski County identified themselves as being of one of the minority groups listed above. Five and one-half percent of Somerset's population reported being a minority. Nine and eight-tenths percent of the population of Kentucky identified themselves as being a minority. **Table 24** provides information on minority and low-income populations in Somerset and Pulaski County.

In 2000, 19.1 percent of the population of Pulaski County was below the poverty level. 22.1 percent of Somerset's population was under the poverty level. 15.8 percent of the population of Kentucky was below the poverty level.

The Socio-Economic Baseline Report [See Section 6, Reference 15] examines the extent to which minority and low-income populations are concentrated in or immediately adjacent to the proposed right-of-way of the proposed project.

Percentages of minority populations in Pulaski County are much less than the statewide minority percentage, while the percentage of low-income population in Pulaski County was above the statewide percentage. However, the majority of this low-income population resides outside the project corridor. Virtually all of the residential displacements associated with the proposed northern bypass alternates can be classified as middle income, non-minority housing. Only two or three potentially displaced residences on the North Alternate appear to be potential poverty level residences. Numerous windshield surveys supplemented by discussions with clergy, elected officials, and neighborhood leaders indicate no disproportionately high or adverse impacts on protected populations would occur with any of the build alternates. No violations of Executive Order 12898 are anticipated.

Meaningful participation occurs when potentially affected community residents have an opportunity to provide input into the decision-making process. Throughout this project, extensive public involvement activities were implemented which brought together local elected officials, community leaders, working groups, the Somerset Citizens Advisory Council and the general public. In addition to providing ample opportunity for community members to raise specific concerns about their property, these public involvement activities helped solicit important input on a collective level that was used to bypass population clusters thereby avoiding or minimizing adverse affects on communities.

3.9 Pedestrian and Bicycle Facilities [See Section 6, Reference 15]

The project corridor presently contains no pedestrian or bicycle facilities. The most likely areas where such facilities might be developed are southwest of Somerset near General Burnside State Park and around Lake Cumberland, all outside the project corridor.

The closest pedestrian facility is a pedestrian bridge that spans KY 80 approximately 300 feet west of the KY 39 intersection.

3.10 UST/Hazardous Materials [See Section 6, Reference 23]

A Phase I Environmental Site Assessment of the project area was conducted in October 2001 and April 2002. The investigation revealed no sites on the active CERCLIS list of potential sites, no sites with incidents involving hazardous materials, no gas wells, oil wells, coal mines or quarries and no municipal solid waste construction debris landfills. Inspections, interviews and records searches identified 46 potential hazardous materials sites within the project area. Of the 46 sites identified, 33 of the sites were far enough away from any alignments that they should not present any problems.

Two trash piles containing wood debris and household trash along with scattered above ground storage tank sites were identified in the project area but determined to be insignificant hazards. Thirteen sites were determined to contain observed, reported, suspected, or potential hazardous materials. **Table 25** identifies each potential site, the type of hazard associated, and whether a full or limited Phase II site assessment will need to be conducted once an alternate is chosen. **Exhibit 20** shows the location of each potential site.

If the **North Alternate** is selected, two full and three limited Phase II site assessments are recommended. If the **Crossover Alternate** is chosen, three full and five limited Phase II site assessments are recommended. If the **South Alternate** is selected, two full and three limited Phase II site assessments are recommended.

See Section 4.1.5 for proposed mitigation measures.

3.11 Visual Impacts [See Section 6, Reference 15]

Pulaski County is located largely in the Mississippian Plateau physiographic region of southern Kentucky. The topography of the project area is characterized by numerous hills and knobs. Karst features such as sinkholes, sinking streams, springs and caves are also in the project area. Caney Fork, a tributary of Pitman Creek, and Pitman Creek cross all three alternates. Lake Cumberland, General Burnside State Park, and the Lake Cumberland Wildlife Management Area are located over five miles south of the proposed project and are not within view from any point within the project corridor. The Daniel Boone National Forest is located east of the project corridor.

The limestone formations in this area are karstic and contain sinkhole and cave features that should be avoided to minimize environmental and construction difficulties as well as to preserve the natural beauty found in and around caves.

The bypass alternates would have little negative impact upon the visual appeal of the countryside. The view of the road and from the road can be enhanced by smoothing existing abrupt grade changes and by providing smooth transitions through the rolling landscape.

The Citizens Advisory Council's Neighborhood Work Group looked at several quality of life parameters including impacts to open spaces. They found that the North Alternate would have the least impact on open spaces which was characterized by the number of households having a view of the highway within a view shed.

3.12 Impacts of Construction Activities

Sources of additional fill, which will not be available from excavation, will come from one or more borrow sites that may be located within and adjacent to the project area. Limited disposal of fill resulting from excavation is anticipated. Any borrow site which might be considered for the proposed project will be surveyed for archaeological resources, and other regulated resources and coordinated and cleared with the appropriate resource agencies The location and use of all borrow and waste sites will follow the requirements and specifications as set forth in the *KYTC Standard Specs for Road and Bridge Construction*.

Expected short-term impacts to surface streams from rechannelization and culvert placement include the disturbance of streambottom and riparian habitat, and temporary increases in turbidity, dissolved solids, nutrients, settleable solids, and suspended solids due to erosion from construction activities. Erosion and siltation during construction will also eliminate or displace aquatic fauna whose foraging, reproduction, or locomotion may be critically hindered by siltation. With proper use of erosion control measures, short-term impacts are expected to be small and can be mitigated.

Other impacts incurred during construction will be short-term and should have no enduring effect. No major detours will be needed and only minor traffic delays can be expected. Noise levels due to the heavy equipment will exceed acceptable standards during the construction period. An increase in particulate matter in the air due to construction activity also will be temporary and should not be detrimental to the health and welfare of local residents. Exhaust from construction equipment will have little or no effect on ambient air quality. Any open air burning will be done in compliance with state regulations and local ordinances. Every reasonable effort will be made to minimize construction noise and air pollution. During the construction stage, adequate construction practices and erosion control procedures will be utilized at areas of potential sedimentation and erosion to ensure that this project will not introduce any additional pollutant which will have detrimental environmental or ecological effects.

3.13 Energy [See Section 6, Reference 15]

The amount of energy required to construct this project will be substantial but temporary in nature. The long-term impact will lead to reduced operating costs upon completion of the project. Cost reductions will result from improved access, reduced travel times and improved safety conditions. These factors generally make the operational costs of the build-alternates less than those of the no-build alternative. The net result is that operational savings of the build-alternates will offset construction energy requirements providing future energy savings.

3.14 Cumulative and Indirect Impacts

Nearly all the cumulative and indirect impacts associated with this project are linked and interrelated, in that the proposed improvement is part of an ongoing process of growth and development in and around Somerset. The addition of a Somerset Northern Bypass not only takes some resources and impacts others but also induces growth and development because it improves access to previously undeveloped areas. The induced growth and development then takes some resources and impacts others. Examples are described below.

Noise

The cumulative effects of the project's highway noise are related to the overall increase of vehicular traffic and roadway facilities in the project area. Ambient noise levels will tend to increase with each step of community growth and development. The effects of the Somerset Northern Bypass will tend not to increase noise levels along KY 80, but rather to reduce it along KY 80 and increase it along the proposed new alignment. The overall effect would be to distribute noise over a broader area.

The indirect effects of the project's highway noise are implied in the paragraphs above. With the creation of a major new roadway facility comes increased growth and development, which contributes to increased ambient noise levels.

Caves and Karst Features

Cumulative impacts on the areas caves and karst features are associated with the overall growth and development of Somerset. Residential, commercial, industrial and other land uses apply pressures on there resources largely by the indirect effects of runoff from constructed facilities and other land-use modifications.

Streams and River Crossings

The project's cumulative effects on streams are associated with the permanent removal of habitat from the area streams by all of the elements of community growth and development. Its indirect effects relate to its inducement of other development, which will permanently remove stream habitat. In this regard, compact development around Somerset would best conserve the areas streams.

Aquatic and Terrestrial Ecosystems

The project's cumulative and indirect effects on all aquatic and terrestrial ecosystems are similar to those effects on the natural resources discussed above. They are related to the ongoing growth and development of Somerset and the surrounding area.

Socio-Economic Impacts – Replacement Housing and Land Use

The following two projects would compete with the proposed Somerset Northern Bypass for land available comparable housing:

- *Relocation of U.S. 27*—This proposed improvement will relocate approximately 13 miles of U.S. 27 north of KY80 in Somerset. The KYTC Six Year Highway Plan (fiscal years 1998-2004) includes this project. Right-of-way acquisition is scheduled for 2003.

- *Proposed Southwest Bypass*—This proposed improvement will connect US 27 south to the Cumberland Parkway west of Somerset. This proposed project is also included in the KYTC Six Year Highway Plan (fiscal years 1998-2004) with right-of-way acquisition expected to begin in 2003.

The Somerset Northern Bypass is expected to contribute to cumulative changes in land use that have already started. Ongoing housing construction for the influx of retirees to the Somerset area, as well as the demand for land and housing that is expected from the two other highway projects described above will compete for available resources in the project area. However, large areas of the project corridor are currently open and undeveloped and the increased development is desired by local officials.

Developing a northern bypass, regardless of which build alternate is chosen, will indirectly alter land-use patterns by increasing the amount of land available for new residential and business/commercial development. Consequently, this development would increase the need for more infrastructure—water, sewer, utilities, secondary roads, etc. A related indirect effect involves the limits to which fire protection can be provided. The City of Somerset and Pulaski County will need to address an administrative restriction, if fire protection is to be provided by Somerset to the proposed bypass and to the growing residential development that is expected to occur in the project corridor. The Somerset Citizens Advisory Council was aware of and discussed these and other matters that should be considered in evaluating highway alternatives. This group concluded that these secondary impacts are in many ways beneficial and should not preclude recommending a build alternate to the KYTC.

Another related indirect impact of a northern bypass is the potential for adjacent farmland to be converted to other uses. Two situations may result, both of which could lead to land presently used for agriculture becoming used for other purposes. In the first situation, a farmer could be approached by a developer who wants to buy the land for redevelopment, and the farmer may find the economic incentive to sell outweighs other interests. In the second situation, a farmer may find that the proximity of a bypass creates adverse travel making farming more difficult or makes farming less appealing for other reasons. Consequently, that farm land is sold for non-agricultural development.